

CYPERACEAE OF EAST AFRICA — IV

By

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CYPERUS L.

Cyperus is without doubt the largest genus of sedges occurring in the tropics. Even in the narrower interpretations of the genus such as the one used here several hundred species of the tropical and subtropical regions are included, many of which are pantropical. In East Africa *Cyperus* species are found in damp places and in water, but some also flourish in the short rainy season of the near desert areas; few have been recorded above 8,000 ft. except in the forest undergrowth, though from the sea shore to about 7,000 ft. they are abundant in all suitable habitats.

Though mostly leafy perennials of moderate size ranging from about 1 to 4 ft. high, a few species, including *C. papyrus*, are conspicuous for their great size, while others are conspicuous for the absence of foliage leaves, or their small very ephemeral or bulbous habit. The variety of form of rootstock and rhizome in the genus is striking and should be noted when material is being gathered, also, for rhizomatous or stoloniferous specimens, it should be noted whether the internodes are short or long and whether the stolons (where present) bear tubers or tunicate bulbs. Not all species with tunicate bulbs have the aerial stem and leaves arising directly from them; many have a short stolon growing out of the bulb which gives rise to the plant. Elongated pseudobulbs such as occur so commonly in *Mariscus* are not seen in *Cyperus* and help to separate these two genera at a point where inflorescence differences are minimal.

The inflorescence may be subtended by few or many leafy bracts, rarely there is only one looking like a continuation of the stem with the inflorescence apparently borne laterally. Though usually spreading and consisting of a simple or compound umbel of spikes there are a few species where the inflorescence is contracted into a simple head and the number of spikelets is correspondingly reduced. An exception to this is *C. pulchellus* in which the inflorescence closely resembles a *Kyllinga*, but the distichous and flattened spikelets with opposite instead of spirally arranged glumes as in the terete *Kyllinga* spikelets serve to separate them easily. The spikes of which the inflorescences are built up may be elongate with a rhachis much longer than the spikelets or digitate with the spikelets clustered at the tips of the peduncle. The spikelets themselves are few to many-flowered and normally comprise a basal pair of empty glumes with a series of distichously arranged fertile glumes above them in the axil of

each of which are the 3 stamens (sometimes only 1-2) with oblong or linear, rarely crested, anthers and an ovary which passes gradually into the simple style with a 3-fid stigma. In a few anomalous species the style is frequently 2-fid and the nutlet lenticular as in *Pycneus*, but such anomalous species may be distinguished by the orientation of the nutlet; in *Cyperus* it is dorso-ventrally compressed (the anterior angle of a normally trigonous nutlet is flattened and the flat side faces the rhachis) and in *Pycneus* it is laterally compressed (the edge of the nutlet is nearest the rhachis). The mature nutlets show little diversity of form or ornamentation, being for the most part smooth and ellipsoid-cylindric, with a triangular section. In a very few species the surface is warted or undulate (transversely waved) and some have a lenticular, not triangular, section as mentioned above.

The species designated as comprising *Juncellus* in the Flora of Tropical Africa vol. 8, and for which provision was made in the key to species in the first paper in the series, have here been included in *Cyperus*. Examination showed that most of them do not consistently have 2-fid stigmas, the main point of deviation between the genera, and that there is less similarity between the species so grouped together than there is between each and the species of *Cyperus* with which they would be associated.

Certain marked omissions will be obvious on a comparison between the species given here and the account in the Flora of Tropical Africa. The affinity of these species is with *Mariscus* rather than *Cyperus* and they will be included in the next, and final, paper dealing with *Pycneus*, *Kyllinga* and *Mariscus* (including *Courtoisia*).

Key to Species

- | | |
|---|---------------------------|
| 1. Inflorescence a solitary dense head (readily confused with <i>Mariscus</i> and <i>Kyllinga</i>) | 77 |
| Inflorescence spreading, branched, simple or compound (rarely a solitary spike) | 2 |
| 2. Inflorescence of one or more elongate spikes having a distinct, and often very long, rhachis | 3 |
| Inflorescence of short spikes of clustered or digitately arranged spikelets, rhachis scarcely discernable or absent | 49 |
| 3. Plants leafless, or with few, very short leaves | 4 |
| Plants leafy | 8 |
| 4. Stems terete, articulated | 5 |
| Stems not articulated | 6 |
| 5. Bracts almost as long as the inflorescences, with a few indistinct articulations | 11. <i>C. corymbosus</i> |
| Bracts very short | 10. <i>C. articulatus</i> |
| 6. Spikes shortly cylindric with numerous small spikelets | 1. <i>C. papyrus</i> |
| Spikes broadly ovate | 7 |

7. Stem-bases coated with fibres; glumes 2.5-3 mm long . . . 12. *C. schimperianus*
Stem-bases not surrounded by fibres; glumes 4-5 mm long . . . 9. *C. holstii*
8. Spikes long cylindric with numerous spikelets . . . 9
Spikes shorter, broadly ovate with fewer spikelets or irregular in outline . . . 17
9. Spikelets terete . . . 10
Spikelets more or less compressed . . . 11
10. Culms stout triangular not winged glumes obtuse . . . 2. *C. grandis*
Culms more slender, triangular with winged angles; glumes subacute
3. *C. digitatus* var. *auricomus*
11. Spikelets rather turgid, inflated . . . 8. *C. alopecuroides*
Spikelets flat . . . 12
12. Spikelets distant . . . 4. *C. exaltatus*
Spikelets crowded together . . . 13
13. Spikes all sessile or subsessile . . . 14
Spikes peduncled and sessile together . . . 16
14. Glumes very small, scarcely over 1 mm long, acuminate . . . 7. *C. imbricatus*
Glumes 1.5-2.5 mm long, obtuse or acute . . . 15
15. Glumes obtuse, golden, 1.5-2 mm long . . . 36. *C. iria*
Glumes acuminate, green or brown, 2-2.5 mm long . . . 35. *C. eleusinoides*
16. Very robust plants with leaves over 20 mm wide; rays up to 10 ins. long
Stout plants with leaves less than 20 mm wide; rays up to 4 ins. long . . . 5. *C. immensus*
6. *C. dives*
17. Spikelets quadrangular in section or subquadrangular . . . 18
Spikelets terete or compressed . . . 22
18. Annual; glumes 3-4 mm long . . . 32. *C. zollingeri*
Perennials . . . 19
19. Glumes dark grey-green . . . 27. *C. maranguensis*
Glumes orange to dark red on the sides . . . 20
20. All rays long, more or less equal . . . 9. *C. holstii*
Rays unequal in length, some very short . . . 21
21. Stems scabrid above . . . 31. *C. schweinfurthianus*
Stems smooth throughout . . . 30. *C. tenuiculmis*
22. Annual . . . 28. *C. sphacelatus*
Perennials . . . 23
23. Stems or stolens bearing bulbs . . . 24
Bulbs absent, rhizome and stolons often tuberous . . . 30
24. Stems distant from the bulbs, bulbs underground . . . 25
Stems arising directly out of the bulbs which are often visible at ground level . . . 27
25. Bulbs large, 8-20 mm diam. at maturity; spikelets well spaced . . . 22. *C. usitatus*
var., *macrobulbus*
Bulbs rarely over 8 mm diam.; spikelets densely spicate . . . 26
26. Bracts 2-3; bulbs brown . . . 22. *C. usitatus* var. *usitatus*
Bracts 4-8; bulbs black . . . 23. *C. stuhlmannii*
27. Stems slender; bracts very short; spike solitary . . . 26. *C. blysmoides*
Stems stouter; bracts 3-6, at least as long as the inflorescence; spikes several . . . 28
28. Spikelets dark red, 10-20 mm long; rays up to 5 mm long . . . 25. *C. bulbosus*
var., *melanolepis*
Spikelets tawny, up to 10 mm long; rays short or absent . . . 29

29. Spikes contracted almost into a head;
rays scarcely present 24. *C. grandibulbosus* var. *grandibulbosus*
At least some of the spikes on well developed rays 24. *C. grandibulbosus* var. *amplus*
30. Stem-bases woody, tuberous, stolons usually stout; leaves never over 20 mm wide 31
Stem-bases usually woody but not tuberous; leaves of some species over 20 mm wide 37
31. Nutlets strongly transversely ridged 14. *C. undulatus*
Nutlets smooth 32
32. Glumes whitish, 1-1.5 mm long 16. *C. maculatus*
Glumes white, red, dark chestnut or black, 1.5-3 mm long 33
33. Glumes whitish or red, up to 2.5 mm long 34
Glumes black, rarely reddish, up to 3 mm long 36
34. Glumes 1.5-2 mm long, white with dark patches on the sides 15. *C. longus*
var. *tenuiflorus*
Glumes 2-2.5 mm long; spikelets 1-1.5 mm wide 35
35. Spikelets reddish 15. *C. longus* var. *longus*
Spikelets whitish 15. *C. longus* var. *pallidus*
36. Spikelets erect, crowded 17. *C. rigidifolius*
Spikelets spreading, distant 18. *C. kilimandscharicus*
37. Stolons present, usually long and slender, bearing tubers (on young plants look carefully
for early signs of stolon development) 38
Stolons absent, plants without tubers 42
38. Spikelets turgid tumid or subcompressed 40
Spikelets strongly compressed 39
39. Plants slender: spikelets reddish brown, 1-2 mm wide 19. *C. rotundus*
Plants more robust; spikelets black, 2.5 mm wide 20. *C. merkeri*
40. Spikelets up to 2 mm wide 41
Spikelets 2-2.5 mm wide 19. *C. rotundus* ssp. *tuberosus*
41. Spikelets red 19. *C. rotundus*
Spikelets orange 21. *C. esculentus*
42. Spikelets terete; glumes rounded on the back 43
Spikelets compressed; glumes mostly keeled on the back 44
43. Spikelets very numerous, crowded; leaves over 25 mm wide 13. *C. latifolius*
Spikelets few, distant; leaves under 12 mm wide 29. *C. gracilinox*
44. Spikelets 3-5 mm wide 45
Spikelets up to 2 mm wide 46
45. Glumes pale throughout; spikelets compressed 37. *C. compressus*
Glumes dark red on the sides; spikelets tumid 38. *C. pustulatus*
46. Spikelets less than 1 mm wide 33. *C. distans*
Spikelets over 1.5 mm wide 47
47. Glumes golden or yellow, obtuse 36. *C. iria*
Glumes black or brownish 48
48. Glumes dark red with broad green keels 34. *C. aterrimus*
Glumes light reddish brown 35. *C. eleusinoides*
49. Perennials usually stout, with woody rhizomes and numerous leaves 50
Annuals or slender-stemmed or leafless perennials 60
50. Spikelets large, 10-20 mm long 51
Spikelets up to 10 mm long 52
51. Spikelets subterete, 2.5-3 mm wide, pale or brownish 62. *C. maritimus*
Spikelets compressed, 3-5 mm wide, red 63. *C. frerei*

52. Spikelets sharply keeled; glumes veined on the back only; bracts very long and very numerous 39. *C. alternifolius* ssp. *fiabelliformis*
Spikelets often somewhat turgid; glumes never sharply keeled, veined on both back and sides 53
53. Glumes ovate when mature, up to 1.5 mm long 54
Glumes oblong 55
54. Culms up to 6 ft. high; spikelets 2-4 mm long 46. *C. renschii*
Culms up to 2 ft. high; spikelets 6-7 mm long; nutlets
conspicuously protruding 45. *C. diffusus* var. *buchholzii*
55. Glumes acute, conspicuously mucronate 56
Glumes obtuse or minutely mucronate 59
56. Glumes up to 1.5 mm long; leaves 1-4 mm wide 40. *C. ajax*
Glumes 2 mm long; leaves up to 2 cm wide 57
57. Spikelets glaucous green buff 43. *C. glaucophyllus*
Spikelets chestnut to dark red 58
58. Spikelets lanceolate 42. *C. pseudoleptocladus* var. *pseudoleptocladus*
Spikelets linear 42. *C. pseudoleptocladus* var. *polycarpus*
59. Leaves up to 1 in. wide; glumes closely overlapping, 2-2.5 mm long, minutely mucronate or emucronate 41. *C. dereilema*
Leaves up to $\frac{1}{2}$ in. wide but usually less; glumes distant;
1.5-2 mm long, obtuse 44. *C. fischerianus*
60. Glumes obtuse, more or less furrowed, membranous; leaf-blades flat or absent 61
Glumes truncate or subacute and mucronate but never obtuse, tougher; leaves narrow and channelled 74
61. Stems very stout, 2-6 mm wide; plants usually leafless 62
Stems narrower, up to 2 mm wide; leafy annuals or perennials or leafless perennials with stems not over 2 mm wide 65
62. Rays very numerous, equal 58. *C. prolifer*
Rays usually fewer, unequal 63
63. Spikelets linear, light brown or reddish, 8-10 mm long at maturity 57. *C. denudatus*
Spikelets narrowly lanceolate, light to dark red, up to 8 mm long at maturity 64
64. Spikelets reddish 56. *C. platycaulis* var. *platycaulis*
Spikelets shining dark blackish red 56. *C. platycaulis* var. *lucenti-nigricans*
65. Glumes dark; perennials 66
Glumes greenish tinged with orange, red or yellow; annuals or slender perennials 67
66. Plants very leafy; spikelets 2.5-4 mm long;
glumes black with pale green keels 48. *C. dichroostachyus*
Leaves few or absent; spikelets 6-8 mm long; glumes dark red 55. *C. phaeorrhizus*
67. Glumes with recurving mucros, often very short or with recurving tips 68
Glumes emucronate or with a straight mucro 70
68. Leaves 8-10 mm wide 53. *C. foliaceus*
Leaves up to 4 mm wide 69
69. Spikelets 3-4 mm wide; glumes spreading at maturity 50. *C. reduncus*
Spikelets 1-2 mm wide 52. *C. tenuispica*
70. Spikelets 3-5 mm wide 71
Spikelets 1-2 mm wide 72
71. Glumes pale throughout; spikelets compressed 37. *C. compressus*
Glumes dark red on the sides; spikelets tumid 38. *C. pustulatus*
72. Glumes shortly mucronate 54. *C. haspan*
Glumes emucronate 73

73. Inflorescence up to 5 mm diam.	51. <i>C. submicrolepis</i>
Inflorescence 6-12 mm diam.	49. <i>C. difformis</i>
74. Slender annuals	75
Woody-based perennials	76
75. Glumes excurrent into a long recurved mucro	60. <i>C. cuspidatus</i>
Glumes with a short straight mucro	61. <i>C. amabilis</i>
76. Spikelets 6-12 mm long; glumes not widely spreading	59. <i>C. tenax</i> var. <i>tenax</i>
Spikelets up to 20 mm long; glumes larger, more distant and widely spreading	59. <i>C. tenax</i> var. <i>pseudocastaneus</i>
77. Spikelets turgid; glumes rounded on the back	78
Spikelets compressed; glumes keeled	80
78. Plants leafless	65. <i>C. laevigatus</i>
Plants leafy	79
79. Rhizome stout; leaves 3-6 mm wide	62. <i>C. maritimus</i>
Rhizomes slender; leaves narrow	64. <i>C. chordorrhizus</i>
80. Perennials; glumes obtuse or shortly mucronate	81
Annuals, sometimes quite tufted	90
81. Stem-bases swollen, tuberous or bulbous; plants leafy	83
Stem-bases not swollen; plants leafless	82
82. Stems acutely angled, 2-4 mm wide	70. <i>C. colymbetes</i>
Stems slender, angles not acute	71. <i>C. nudicaulis</i>
83. Spikelets up to 8 mm long; plants slender	66. <i>C. pulchellus</i>
Spikelets over 8 mm long; plants stouter	84
84. Glumes pinkish brown; maritime shores	63. <i>C. frerei</i>
Glumes white, yellow or red	85
85. Rhizome horizontal with long internodes; glumes acute	67. <i>C. angolensis</i>
Rhizome descending or horizontal with short internodes, or absent; glumes obtuse	86
86. Spikelets 2.5-4 mm wide	88
Spikelets 4-10 mm wide	87
87. Spikelets 3-7, subcompressed; a rare species	68. <i>C. margaritaceus</i>
Spikelets 5-20 or more, compressed; a common, very variable species	69. <i>C. obtusiflorus</i>
88. Glumes whitish or green	47. <i>C. mapanioides</i>
Glumes dark red	89
89. Bracts 2-3; bulbs brown	22. <i>C. usitatus</i>
Bracts 4-8; bulbs black	23. <i>C. stuhlmannii</i>
90. Glumes emucronate	32. <i>C. zollingeri</i>
Glumes conspicuously mucronate	91
91. Bracts 2.5-4 ins. long, abruptly widening at the base	75. <i>C. pygmaeus</i>
Bracts shorter and not abruptly widened below	92
92. Basal sheaths entire, membranous	93
Basal sheaths becoming fibrous	72. <i>C. bellus</i>
93. Spikelets 4-5 mm wide	74. <i>C. teneriffae</i>
Spikelets up to 3 mm wide	94
94. Very slender plants with spikelets up to 1.5 mm wide	60. <i>C. cuspidatus</i>
Slender plants slightly swollen at the base; spikelets wider	73. <i>C. caessneri</i>

1. *C. papyrus* L.

Leafless, stout-stemmed, rhizomatous perennial up to 18 ft. high. Inflorescence compound, spreading, with 1-2 cm long spikes of linear, narrow 6-10 mm long spikelets with green-keeled glumes. Rivers, dams, lakes, swamps, but always in water; 1,500-7,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread.

UGANDA—Widespread.

2. *C. grandis* C.B.C1.

Stout perennial up to 6 ft. high with leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. wide. Inflorescence large with numerous spikelets 8-18 mm long and over 1 mm wide in cylindric spikes 2-5 cm long; glumes ovate, obtuse. Swamps, sea level—500 ft.

KENYA—Coast.

TANGANYIKA—Coast.

ZANZIBAR—Zanzibar and Pemba Islands.

3. *C. digitatus* Roxb. ssp. *auricomus* (Spreng.) Kukenthal

(*C. auricomus* Sieber ex Spreng.)

Tufted perennial 1 $\frac{1}{2}$ -5 ft. high with numerous leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. wide. Inflorescence large and spreading with numerous golden or reddish linear spikelets 10-20 mm long in loose cylindric spikes 2.5-6.5 cm long. River banks, seasonal and permanent swamps; 1,500-7,500 ft.

KENYA—Western, Rift Valley, Central Regions and Nairobi.

TANGANYIKA—Widespread in suitable places.

UGANDA—Western and Eastern Provinces.

4. *C. exaltatus* Retz.

Stout tufted perennial 1-4 ft. high with leaves up to $\frac{1}{2}$ in. wide. Inflorescence large and compound with numerous distant compressed golden spikelets 4-10 mm long in cylindric spikes. Glumes ovate, obtuse, with a recurved mucro. In shallow water at the edge of dams, pools, lakes and rivers; sea level—6,000 ft.

KENYA—The coast and Nairobi.

TANGANYIKA—Northern, Tanga Regions and the coast.

ZANZIBAR—Zanzibar Island.

5. *C. immensus* C.B.C1.

Large tufted perennial up to 8 ft. high with leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ ins. wide. Inflorescence very large with numerous linear-lanceolate compressed spikelets 6-15 mm long in sessile or subsessile dense, broadly cylindric spikes. Glumes with a rigid conspicuous mucro and green keel. Rivers, swamps, dams and seasonally flooded places; 200-8,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread.

UGANDA—Buganda, and probably throughout the country.

ZANZIBAR—Zanzibar Island.

6. *C. dives* Del.

(*C. exaltatus* Retz. var. *dives* (Del.) C.B.C1.)

Large tufted perennial up to 5 ft. high with leaves up to $\frac{3}{4}$ in. wide. Inflorescence large, with numerous compressed spikelets 4-8 mm long in dense cylindric spikes. Glumes with a short straight mucro. Differs from *C. immensus* chiefly in the smaller size, and from *C. imbricatus* by some or all of the spikes being pedunculate. Swamps; 2,000-6,000 ft.

KENYA—Widespread.

TANGANYIKA—Northern and Tanga Regions.

UGANDA—Western Province and Buganda.

7. *C. imbricatus* Retz.

(*C. radiatus* Vahl)

Stout tufted perennial 1 $\frac{1}{2}$ -4 ft. high with narrow leaves. Inflorescence of numerous oblong-lanceolate compressed spikelets 3-7 mm long in dense sessile spikes. Glumes small, obtuse, greenish, with a short recurving mucro. Wet sandy places and river banks, uncommon; sea level—4,000 ft.

TANGANYIKA—Western and Southern Highland Regions and along the Rufiji River.

UGANDA—Western Province.

8. *C. alopecuroides* Rottb.(*Juncellus alopecuroides* (Rottb.) C.B.C1.)

Stout leafy perennial up to 5 ft. high. Inflorescence large with numerous lanceolate, acute, somewhat turgid spikelets 4-8 mm long in oblong cylindric spikes. Glumes 2-2.5 mm long, rounded on the back, tawny or greenish. Swamps, dams, rivers, usually in standing water; sea level—5,000 ft.

KENYA—Widespread but not common.

TANGANYIKA—Widespread in the northern part of the country.

9. *C. holstii* Kukenthal(*C. zollingeri* var. *robusta* K. Schum.)

Tufted plant with long stout stolons, stout stems, and the leaves reduced to the sheaths only. Inflorescence large with numerous quadrangular tawny or light chestnut spikelets 15-40 mm long in subdigitate spikes of 3-8 spikelets. Glumes obtuse, 4-5 mm long. Damp grassland and swamps; sea level—800 ft.

KENYA—Coast.

TANGANYIKA—Coast.

The spikelets have a marked resemblance to *C. tenuiculmis* but the long and more numerous rays give the inflorescence a very different appearance.

10. *C. articulatus* L.

Leafless perennial with distant septate terete stems 2-6 ft. high. Inflorescence spreading with compressed spikelets 8-30 mm long. Glumes reddish, obtuse, green keeled. Dams, swamps, lakes; sea level—5,500 ft.

KENYA—Widespread.

TANGANYIKA—Widespread, and Mafia Island.

UGANDA—Widespread.

ZANZIBAR—Zanzibar Island.

11. *C. corymbosus* Rottb.

Very similar to *C. articulatus* but differs in the obscurely septate stems and the 2-4 scabrid-margined leaf-like bracts almost as long as the inflorescence. Rare in dams, swamps and lakes; 1,000-2,000 ft.

TANGANYIKA—Tanga Region.

12. *C. schimperianus* Steud.

Perennial 2-3 ft. high with trigonous or subterete stems surrounded by fibres at the base. Inflorescence with linear-oblong spikelets 8-18 mm long. Glumes distant, 2.5-3 mm long, rounded. Damp places, stream banks; 3,000-5,000 ft.

KENYA—Nairobi.

TANGANYIKA—Northern, Western and Tanga Regions.

UGANDA—Northern Province.

13. *C. latifolius* Poir.

Tufted perennial 1-6 ft. high. Leaves over 1 in. wide. Inflorescence large with broadly ovate dense spikes of 10-20 mm long spikelets. Glumes brown with conspicuous white margins. Swamps and wet places; 1,000-7,000 ft.

KENYA—Western, Central and Eastern Regions and Nairobi.

TANGANYIKA—Northern, Tanga, Western and Southern Highland Regions.

UGANDA—Western Province and Buganda.

14. *C. undulatus* Kukenthal

Stoloniferous perennial up to 2 ft. high with leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. wide. Inflorescence spreading with broadly ovate dense spikes. Spikelets spreading, linear, 10-25 mm long with obtuse, tawny glumes with white margins and green keels. Nutlets conspicuously transversely wrinkled. Damp and seasonally inundated places in dry bush and grassland; 1,000-3,500 ft.

KENYA—East of the Rift Valley, not common.

TANGANYIKA—Northern, Tanga and Eastern Regions.

15. *C. longus* L. var. *longus*

Tufted rhizomatous perennial up to 3 ft. high with scabrid-margined leaves. Inflorescence spreading with distant, suberect bright chestnut linear spikelets 10-25 mm long, up to 2 mm wide. Glumes 2-2.5 mm long, obtuse, with broad white margins. Seasonally inundated grassland; 1,000-4,000 ft.

KENYA—Northern Region.

TANGANYIKA—Tanga and Western Regions

var. *pallidus* Boeck.

This variety differs from the above only in the pale, off-white spikelets. Seasonally inundated places, very uncommon; 2,000-4,000 ft.

TANGANYIKA—Western Region.

UGANDA—Eastern Province.

var. *tenuiflorus* (Rottb.) Boeck.

Plant more slender than the above and rarely over 1-1½ ft. high. Spikelets linear, 10-25 mm long but only 1 mm wide, whitish but with chestnut patches on the sides and wide white margins. Near water, lake shores and river banks; 500-4,000 ft.

KENYA—Western Region.

TANGANYIKA—Lake, Northern, Western Regions and the Coast.

UGANDA—Western Province and Buganda.

16. *C. maculatus* Boeck.

Tufted perennial 1-1½ ft. high very similar to *C. longus* var. *tenuiflorus* but with much narrower leaves. Spikelets similar but shorter, 1 mm wide and lacking the dark patches of the above. Damp places and lake shores; 2,000-4,000 ft.

TANGANYIKA—Western Region.

UGANDA—Western Province.

17. *C. rigidifolius* Steud.

Stoloniferous perennial 4-12 ins. high with a stout woody rhizome. Inflorescence with numerous oblong-lanceolate spikelets 6-10 mm long, 2 mm wide, crowded into very dense ovate spikes, but often very reduced. Glumes dark red or black, green keeled. Damp places in grassland and near water; 4,000-11,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread, but less common towards the south.

UGANDA—Widespread.

There is considerable variation in the reduced forms normally included in this species and it is possible that a few of these should be ascribed to the rather similar *C. fissus*.

18. *C. kilimandscharicus* Kuenthal

Rhizomatous perennial 2-3 ft. high with tuberous-swollen culm-bases coated with fibrous sheath remnants. Inflorescence rather dense with oblong-lanceolate black spikelets 5-7 mm long, 2-2.5 mm wide, with shortly mucronate green keeled glumes 2.5-3 mm long. Seasonally swampy places, usually on black cotton soils; 3,500-5,500 ft.

KENYA—Central Region and Nairobi.

TANGANYIKA—Lake, Northern and Central Regions.

19. *C. rotundus* L.

Very variable perennial 6 ins.-2 ft. high with slender stolons bearing tubers. Inflorescence spreading with linear-lanceolate compressed or terete spikelets 10-20 mm long, 2-2.5 mm wide in short ovate spikes. Glumes ovate, acute or subobtusate, pale or dark red usually with a green keel and white margins. Grassland, swamps, damp places; sea level—6,000 ft.

KENYA—Widespread but not very abundant.

TANGANYIKA—Lake, Northern, Tanga, Western and Eastern Regions.

UGANDA—Widespread.

ZANZIBAR—Zanzibar and Pemba Islands.

Several subspecies and varieties have been described but the interpretation and synonymy of these is so complex that no attempt will be made here to distinguish them.

20. *C. merkeri* C.B.Cl.

(*C. rotundus* L. var. *spadiceus* Boeck., *C. rotundus* ssp. *merkeri* (C.B.Cl.) Kuenthal).

Tufted perennial 1½-2 ft. high. Stems often scarbrid. Inflorescence with strongly compressed spikelets 15-20 mm long, 2.5 mm wide, with dark red shining green-keeled glumes. Damp places in woodland and grassland; sea level—6,500 ft.

KENYA—Widespread.

TANGANYIKA—Widespread.

UGANDA—Western and Northern Provinces.

ZANZIBAR—Zanzibar Island.

21. *C. esculentus* L.

Perennial 4 ins.-1½ ft. high with slender tuber-bearing stolons. Inflorescence spreading, with ovate spikes of golden or tawny liner-oblong obtuse spikelets 5-12 mm long. Glumes

truncate, obtuse, rounded on the back. Seasonally swampy places, ditches and as a weed; sea level—7,000 ft.

KENYA—Widespread above about 4,500 ft.

TANGANYIKA—Widespread.

UGANDA—Western, Eastern Provinces and Buganda.

ZANZIBAR—Zanzibar Island.

22. *C. usitatus* Burch. var. *usitatus*

Small, single-stemmed plants up to 8 ins. high developed away from the bulb to which they are attached by a short slender stolon. Bulbs brown, shiny. Inflorescence simple, dense, 15-30 mm diam. with linear-lanceolate acute shining red spikelets 6-15 mm long, 2 mm wide. Glumes ovate, shortly mucronate. Grasslands, seasonally swampy places and as a weed; 3,500-6,000 ft.

KENYA—Rift Valley.

TANGANYIKA—Lake, Northern, Western and Central Regions.

UGANDA—Karamoja.

var. *macrobulbus* Kukenthal

Similar to the above except for its greater size, larger bulb etc. It is easily confused with the following species.

TANGANYIKA—Central Region.

23. *C. stuhlmannii* C.B.C1.

Small plants up to 1 ft. high developed apart from the black 6-8 mm diam. bulbs. Inflorescence more ample than that of the above species, 12-18 mm diam. with linear-lanceolate acute spikelets 6-8 mm long, 2-2.5 mm wide. Glumes dark red subobtusely or acute. Grasslands and seasonally swampy places; 2,500-5,500 ft.

KENYA—Western Region and the Rift Valley.

TANGANYIKA—Lake Region.

24. *C. grandibulbosus* C.B.C1. var. *grandibulbosus*

Perennial up to 1½ ft. high with a solitary stem arising from a black 6-10 mm diam. bulb. Inflorescence contracted, with tawny-orange linear spikelets 8-10 mm long, 3 mm wide in a dense head. Sandy soils in seasonably damp places and on rocky outcrops; 1,500-4,500 ft.

KENYA—Northeastern, Eastern and Central Regions.

TANGANYIKA—Northern and Tanga Regions.

var. *amplus* Kukenthal

Plants larger than the above and the inflorescence spreading. Sandy soils in seasonally damp places; 1,500-4,500 ft.

KENYA—Northeastern and Eastern Regions.

25. *C. bulbosus* Vahl var. *melanolepis* Kukenthal

Perennial up to 1½ ft. high with a single stem arising out of a black or very dark brown bulb 6-10 mm wide. Inflorescence spreading with distant compressed spikelets 10-20 mm long, 1.5 mm wide, with dark red glumes. The inflorescence of this species is readily confused with *C. merkeri*, but the habit is very different. Damp places in dry grassland; 2,500-5,000 ft.

KENYA—Southern Region.

TANGANYIKA—Northern and Tanga Regions.

26. *C. blysmoides* C.B.C1.

(*C. bulbosus* Vahl var. *spicatus* Boeck., *C. blysmoides* Hochst. nom. nud.)

Stems 4-12 ins. high arising directly out of a black bulb. Inflorescence a single spike without bracts, of 3-6 linear spikelets 8-12 mm long. Glumes shortly mucronate, dark red or pale. Weed, usually in damp places; 1,500-6,000 ft.

KENYA—Northern, Rift Valley, Central and Eastern Regions and Nairobi.

TANGANYIKA—Northern and Tanga Regions.

27. *C. maranguensis* K. Schum.

Tufted perennial up to 3 ft. high. Inflorescence of broadly ovate spikes of dark grey-green linear spikelets 15-20 mm long, 1.5 mm wide. Glumes elliptic obtuse. Upland and mountain forests; 2,000-7,000 ft.

KENYA—Northern and Central Regions and Nairobi.

TANGANYIKA—Northern, Tanga and Eastern Regions.

UGANDA—Buganda.

28. *C. sphacelatus* Rottb.

Tufted annual up to 2 ft. high. Inflorescence rather scanty with distant linear-lanceolate acute greyish-yellow spikelets 6-20 mm long, 1.5 mm wide. Glumes obtuse, green-keeled with white margins. Woodland and damp places; 1,000-4,000 ft.

TANGANYIKA—Lake, Western and Southern Regions.

UGANDA—Buganda.

29. *C. gracilinus* C.B.C1.

Stoloniferous perennial 9 ins.-1½ ft. high. Inflorescence rather scanty with spreading linear-lanceolate acute spikelets 16-24 mm long, 2 mm wide. Glumes subobtusate, reddish with white hyaline margins and green keels. Seasonally swampy places, vlei; sea level—2,000 ft.

TANGANYIKA—Tanga Region.

30. *C. tenuiculis* Boeck.

(*C. zollingeri* non Steud.)

Tufted perennial 8 ins.-3 ft. high with short stolons and swollen stem-bases. Inflorescence simple, with yellow or reddish linear acute spikelets 15-20 mm long and 3 mm wide. Glumes distant, obtuse, green-keeled. Grassland, woodland and damp places; 3,000-6,000 ft.

KENYA—Western Region.

TANGANYIKA—Western and Central Regions.

UGANDA—Western Province and Buganda.

31. *C. schweinfurthianus* Boeck.

(*C. zollingeri* auct., var. *schweinfurthianus* (Boeck.) Kukenthal)

Perennial very similar to the above but the scabrous stems, and spikelets up to 30 mm long, 2.5 mm wide. Woodland, swamps and damp places; 3,000-5,000 ft.

TANGANYIKA—Western and Southern Highland Regions.

UGANDA—Western and Eastern Provinces.

32. *C. zollingeri* Steud.

(*C. rubroviridis* Cherm., *C. sphacelatus* var. *tenuior* C.B.C1.)

Annual 6-12 ins. high. Inflorescence simple, spreading or contracted with short dense spikes. Spikelets linear-lanceolate, subquadrate, 8-30 mm long, 1.5-2 mm wide, with distant glumes 3-4 mm long. Damp places, stream banks, and grasslands; sea level—500 ft.

KENYA—Coast.

TANGANYIKA—Coast.

ZANZIBAR—Zanzibar Island.

33. *C. distans* L.f.

(Including *C. ferrugineo-viridis* var. *distansiformis* Kukenthal in part)

Tufted perennial 1-3 ft. high with scabrid-margined leaves. Inflorescence large and spreading with dense spikes of dark spikelets obliquely spreading at first, becoming reflexed. Spikelets dark red or black, 10-20 mm long, less than 1 mm wide, with distant obtuse glumes with a rounded green back becoming spreading at maturity. Damp places, stream banks, lake shores and rivers; sea level—8,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread.

UGANDA—Widespread.

ZANZIBAR—Zanzibar and Pemba Islands.

34. *C. aterrimus* Steud.

Tufted perennial up to 4 ft. high with scabrid margined leaves. Inflorescence large, spreading, with black erect linear-lanceolate spikelets 10-20 mm long, 2 mm wide, with distant, keeled, obtuse glumes. In mist and mountain forests, damp places and seasonally flooded grassland; 3,500-10,000 ft.

KENYA—Widespread but not common.

TANGANYIKA—Widespread but not common.

UGANDA—Western Province.

35. *C. eleusineoides* Kunth

Perennial up to 4 ft. high with woody rhizome. Inflorescence large, with dense spikes of greeny-brown linear-oblong, acute spikelets 4-8 mm long. Glumes ovate-elliptic, mucronate, 2 mm long. Locally common on river banks and in swampy places; 3,000-4,500 ft.

UGANDA—Karamoja and the Eastern Province.

36. *C. iria* L.

Tufted perennial up to 2 ft. high. Inflorescence simple or compound with oblong compressed, obtuse, golden or yellow spikelets 5-10 mm long, in ovate or ovate-oblong short spikes. Glumes distant, broadly ovate, green-keeled, rounded, 1-1.5 mm long. Swamps, dams and ponds, rare; 3,000-4,500 ft.

KENYA—Western Region.

TANGANYIKA—Northern Region.

37. *C. compressus* L.

Tufted annual 6 ins.-1½ ft. high. Inflorescence simple, often contracted, with subdigitately arranged linear-oblong spikelets 10-20 mm long, 2.5-4 mm wide, with closely overlapped ovate, conspicuously mucronate glumes. Swamps and damp places, often in standing water; sea level—3,000 ft.

KENYA—Northeastern Region and the Coast.

TANGANYIKA—Lake, Tanga and Southern Regions and the Coast.

ZANZIBAR—Zanzibar Island.

38. *C. pustulatus* Vahl

Tufted annual 1-1½ ft. high. Spikelets subterete, 6-12 mm long, 3-3.5 mm wide, in very short or subdigitate spikes. Glumes rounded, obtuse, grey-green streaked with red. Stream banks, swampy places; 3,500-4,500 ft.

TANGANYIKA—Lake and Western Regions.

39. *C. alternifolius* L. ssp. *flabelliformis* (Rottb.) Kukenthal

Tufted leafless perennial 1½-6 ft. high. Inflorescence spreading with numerous leaflike bracts partially concealing the small clusters of 3-7 pale or brownish linear-oblong spikelets 5-8 mm long 1.5-2 mm wide. Damp places, swamps and stream banks; sea level—5,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread.

UGANDA—Widespread.

ZANZIBAR—Zanzibar and Pemba Islands.

40. *C. ajax* C.B.Cl.

Stout perennial 3-5 ft. high with leaves up to 1½ ins. wide. Inflorescence large with ovate or oblong-lanceolate reddish spikelets 2-5 mm long, in clusters of 3-5. Glumes conspicuously mucronate 1.5 mm long. Mountain and bamboo forests; 2,000-10,000 ft.

KENYA—Mountains over 7,000 ft.

TANGANYIKA—Northern, Tanga and Southern Highland Regions.

UGANDA—Western Province.

41. *C. dereilema* Steud.

(*C. deckenii* Boeck., *C. dereilema* ssp. *deckenii* (Boeck.) Kukenthal)

Stout perennial 3-5 ft. high with leaves up to 1 in. wide. Inflorescence large with digitate clusters of ovate-lanceolate spikelets 4-10 mm long, 2-2.5 mm wide. Glumes tawny, brown, or dark red, obtuse. Many of the specimens examined show the tendency to leafy proliferation of the inflorescence common in most species of this group (species 40-46). Bamboo and mountain forests; 6,000-10,000 ft.

KENYA—Widespread.

TANGANYIKA—All upland areas.

UGANDA—All upland areas.

42. *C. pseudoleptocladus* Kukenthal var. *pseudoleptocladus*

(Including *C. deckenii* C.B.Cl., not of Boeck.)

Stout leafy perennial rather similar to the above but with leaves ¼-½ in. wide. Inflorescence dense with oblong-ovate spikelets 5-10 mm long, 1.5-2 mm wide. Glumes 2 mm long, brown or green conspicuously mucronate. Swamps and forests; 3,000-7,000 ft.

KENYA—Eastern Region.

TANGANYIKA—Northern, Tanga and Eastern Regions.

UGANDA—Western and Eastern Provinces and Buganda.

var. *polycarpus* Kukenthal

Differs from the above in the more branched and less crowded inflorescence and the slightly larger, narrower and darker spikelets. Locally abundant in open places; 3,000-8,000 ft.

KENYA—Western, Rift Valley, Northern and Eastern Regions.

TANGANYIKA—Kilimanjaro and the Usambara Mts.

UGANDA—Eastern Province.

43. *C. glaucophyllus* Boeck.

Stout perennial up to 3 ft. high with leaves less than $\frac{1}{2}$ in. wide. Inflorescence large with solitary or clustered oblong-linear pale greenish spikelets 4-15 mm long, 1.5-2 mm wide. Glumes obovate, mucronate. Very similar to *C. dereilema* except for the spikelets. Forest; 3,000-7,000 ft.

TANGANYIKA—Pare and Usambara Mts.

UGANDA—Western Province.

44. *C. fischerianus* A. Rich.

Tufted perennial 1-3 ft. high with scabrid-margined leaves less than $\frac{1}{2}$ in. wide. Inflorescence large, compound, with oblong-lanceolate spikelets 4-6 mm long, 1.5-2 mm wide. Glumes ovate-oblong, reddish with a green keel, obtuse. Inflorescence usually proliferating and arching down to the ground and taking root. Mountain forest; 4,000-8,000 ft.

KENYA—All Highland areas.

TANGANYIKA—Kilimanjaro.

UGANDA—All mountain ranges.

45. *C. diffusus* Vahl ssp. *buchholzii* (Boeck.) Kuenthal

Tufted perennial 1-2 ft. high, rather slender. Inflorescence large with brownish spikelets 6-7 mm long, 2-2.5 mm wide. Glumes with recurved mucros. Nutlets protruding conspicuously except from very immature spikelets. Damp places in dense bush and forest; 1,000-7,000 ft.

KENYA—Western and Rift Valley Regions.

TANGANYIKA—Western, Central and Tanga Regions.

UGANDA—Western, Eastern Provinces and Buganda.

46. *C. renschii* Boeck.

Tufted perennial up to 6 ft. high with leaves up to 1 in. wide. Inflorescence large with ovate spikelets 2-4 mm long. Glumes green, 1 mm long, with a recurved mucro. Forest clearings; sea level—7,000 ft.

KENYA—Coast, Southern Region.

TANGANYIKA—Widespread.

UGANDA—Western Province.

ZANZIBAR—Zanzibar Island.

47. *C. mapanioides* C.B.C1. var. *major* (Boeck.) Kuenthal

(*C. dichromenaeformis* Kunth var. *major* Boeck.)

Tufted perennial 1-2 ft. high with stems somewhat swollen at the base. Inflorescence a simple contracted globose whitish head of compressed spikelets 6-14 mm long, 2.5-3.5 mm wide. Forests; 3,000-6,000 ft.

KENYA—Elgon.

TANGANYIKA—Western Region.

UGANDA—Sese Islands, Buganda.

48. *C. dichroostachyus* Hochst.

Tufted perennial 1-3 ft. high, with long stolons. Inflorescence rather dense with dark spikelets 2.5-4 mm long, 1-1.5 mm wide. Glumes black with broad, light green keels. Swampy places, stream banks dams; 4,000-8,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread, but more common in the north.

UGANDA—Western Province.

49. *C. difformis* L.

Erect perennial 9 ins.-1½ ft. high, often flowering as an annual. Inflorescence with numerous spikelets congested into dense greenish or red globose heads 6-12 mm diam. Spikelets 4-8 mm long, up to 1.5 mm wide. Dams, rivers, swampy places and seepage zones on rocky outcrops; sea level—5,500 ft.

KENYA—Western, Central and Southern Regions, Nairobi and the Coast.

TANGANYIKA—Widespread in the northern part of the country.

UGANDA—Western and Eastern Provinces and Buganda.

50. *C. redundus* Boeck.

Annual 4-12 ins. high. Inflorescence of clustered pale green spikelets 5-10 mm long, 3-4 mm wide, with oblong-lanceolate recurving glumes. Swamps and rivers; 3,000-4,000 ft.

UGANDA—Buganda and Eastern Province.

51. *C. submicrolepis* Kukenthal(*C. microlepis* C.B.C1. non Baker).

Tufted annual 2-12 ins. high. Inflorescence of greenish clustered spikelets up to 4 mm long, 1.5 mm wide. Glumes obovate, closely overlapping. Poor shallow soils on rocky outcrops; 3,000-4,000 ft.
UGANDA—Buganda.

52. *C. tenuispica* Steud.(*C. flavidus* C.B.C1.)

Slender densely tufted ephemeral with yellowish leaves. Inflorescence of rather yellowish spikelets 4-12 mm long with spreading truncate glumes less than 1 mm long. Swampy places; sea level—3,500 ft.

TANGANYIKA—Northern, Tanga, Western, Eastern, Southern Regions and Mafia Island.

UGANDA—Buganda.

ZANZIBAR—Zanzibar Island.

53. *C. foliaceus* C.B.C1.

Slender annual similar to the above, 1 ft. high. Spikelets 5-8 mm long, 1 mm wide, with truncate glumes 1.5 mm long. Stream banks; 500-4,000 ft.

KENYA—Coast.

TANGANYIKA—Tanga and Southern Regions.

UGANDA—Buganda.

54. *C. haspan* L.(*C. cancellatus* Ridl.)

Slender stoloniferous perennial up to 1½ ft. high with short leaves or leafless. Inflorescence branched, with clustered spikelets 5-10 mm long, 1 mm wide. Glumes 1-1.5 mm long, shortly mucronate. Standing water, swamps, ditches, rivers; sea level—5,500 ft.

KENYA—Western, Eastern and Coast Regions.

TANGANYIKA—Widespread, especially in the north.

UGANDA—Western and Eastern Provinces and Buganda.

55. *C. phæorrhizus* K. Schum.

Slender perennial up to 1½ ft. high. Inflorescence simple, of dark red shining spikelets 6-8 mm long with ovate-oblong truncate glumes. Dams, rivers, seasonally swampy places and seepage zones; 3,500-10,000 ft.

KENYA—Widespread.

TANGANYIKA—Widespread, especially in the north.

UGANDA—Widespread.

56. *C. platycaulis* Baker var. *platycaulis*(*C. denudatus* var. *platycaulis* C.B.C1.)

Leafless perennial 1-3 ft. high with a stout woody rhizome and 3-winged stems. Inflorescence dense with numerous red spikelets 5-8 mm long, up to 1 mm wide, with small obtuse glumes. Very similar to *C. denudatus*. Streams, lake shores, dams; sea level—8,000 ft.

KENYA—Central Region and the Coast.

TANGANYIKA—Lake, Northern, Tanga and Western Regions.

There is much confusion over the precise limits of this species, and it is possible that most of the above localities refer to the following variety which is much more abundant in East Africa.

var. *lucenti-nigricans* (K. Schum.) Kukenth.

Leafless perennial with clumps up to 8 mm wide. Inflorescence similar to the above but with dark red or black shining glumes. Swamps, dams and lake shores; 5,000-10,000 ft.

KENYA—Widespread. Western, Rift Valley, Central and Southern Regions and Nairobi.

TANGANYIKA—Widespread.

UGANDA—Western Province.

57. *C. denudatus* L.f.

Leafless perennial 1-3 ft. high with triangular stems and creeping rhizome. Inflorescence similar to the above species, but the spikelets 8-10 mm long, up to 2 mm wide, with ovate-lanceolate glumes. Lake shores, streams, swamps and seasonally flooded places; sea level—7,000 ft.

KENYA—Central, Eastern and Coast Regions.

TANGANYIKA—Widespread in the north of the country.

UGANDA—Western Province.

ZANZIBAR—Zanzibar Island.

There has been much confusion between *C. denudatus*, *C. phaeorrhizus* and *C. platycaulis* var. *lucenti-nigricans* and they are possibly not all specifically distinct.

58. *C. prolifer* Lam.

Rhizomatous leafless perennial 1-3 ft. high with terete or 3-sided stems. Inflorescence umbellate with equal rays, usually proliferating. Spikelets linear, 6-12 mm long, 1 mm wide with obtuse, light red glumes. Swamps, seasonally flooded places and standing water, looking like a small papyrus; sea level—1,500 ft.

KENYA—Southern Region and the Coast.

TANGANYIKA—Eastern, Southern Highland and Southern Regions and the Coast.

ZANZIBAR—Zanzibar Island.

59. *C. tenax* Boeck, var. *tenax*

(*C. grantii* C.B.Cl.)

Tufted leafy perennial 3-12 ins. high with glaucous, coriaceous leaves crowded at the base. Inflorescence spreading with red or dark chestnut spikelets 6-12 mm long, 1-1.5 mm wide. Glumes obtuse, green-keeled. Sandy soils in bush and damp places; sea level—3,000 ft.

KENYA—Eastern Region and the Coast.

TANGANYIKA—Southern Region, the Coast and Mafia Island.

ZANZIBAR—Zanzibar and Pemba Island.

var. *pseudocastaneus* (Kukenthal) Kukenthal

(*C. boehmii* Boeck.)

Differs only in the darker spikelets and the more distant, spreading glumes. Thicket and woodland on sandy soils, damp places; 3,500-6,000 ft.

TANGANYIKA—Lake, Western, Central and Southern Highland Regions.

UGANDA—Western Province.

60. *C. cuspidatus* H.B.K.

Slender annual 2-6 ins. high with filiform leaves. Inflorescence of shortly pedunculate clusters often reduced to sessile, clusters appearing lateral to the bract. Spikelets chestnut 8-15 mm long, linear, with long-mucronate recurving glumes. Damp places, seepage zones on rocky outcrops; sea level—4,500 ft.

KENYA—Northern and Eastern Regions.

UGANDA—Buganda and Eastern Province.

ZANZIBAR—Pemba Island.

This species can easily be confused with slender plants of *Mariscus maderaspatanus*.

61. *C. amabilis* Vahl

Slender annual 2-10 ins. high with few leaves. Inflorescences of linear orange or brown spikelets 8-18 mm long, 3-4 mm wide. Seepage zones on rocky outcrops, lake shores and swampy places; sea level—5,000 ft.

KENYA—Northern, Rift Valley, Southern Regions and the Coast.

TANGANYIKA—Northern, Tanga, Western, Central and Southern Regions and the Coast.

UGANDA—Eastern Province.

ZANZIBAR—Zanzibar Island.

62. *C. maritimus* Poir.

Stout leafy perennial up to 1 ft. high. Inflorescence rather dense with oblong-lanceolate spikelets 12-30 mm long, 3-4 mm wide, with crowded obtuse glumes. Dry sandy places on river banks and the sea shore; sea level—500 ft.

KENYA—Coast.

TANGANYIKA—Coast and Mafia Island.

ZANZIBAR—Zanzibar Island.

63. *C. frerei* C.B.Cl.

Rhizomatous perennial 1 ft. high with narrower leaves than *C. maritimus*. Inflorescence dense 1-2 ins. diam., or occasionally with rays up to 2 ins. long. Spikelets cinnamon or reddish-purple, 16-40 mm long, 3-5 mm wide. Sandy damp places; sea level.

KENYA—Coast.

64. *C. chordorrhizus* Chiov.

Low-growing perennial with a slender branched rhizome. Lateral shoots long, sterile, with semiterete glaucous leaves 1-2 ins. long crowded at the tips. Terminal shoots short, fertile, with leaves up to $\frac{1}{2}$ in. long. Inflorescence capitate, 4-6 mm wide with bracts dilated at the base. Spikelets ovate-lanceolate, 3-7 mm long with whitish glumes. Coastal sand dunes; sea level.

KENYA—Coast.

65. *C. laevigatus* L.

(*Juncellus laevigatus* (L.) C.B.C1.)

Rhizomatous perennial up to 2 ft. high with stout leafless stems. Inflorescence a contracted, pseudolateral head of pale or dark spikelets 5-20 mm long, 2-2.5 mm wide. Glumes rounded on the back, 3 mm long. Swamps, lake shores and dams; sea level—6,500 ft.

KENYA—Widespread.

TANGANYIKA—Lake, Northern and Western Regions.

UGANDA—Western Province.

66. *C. pulchellus* R. Br.

(*C. leucocephalus* Nees non Retz.)

Tufted perennial up to 1½ ft. high with bulbous-based stems. Bracts reflexed. Inflorescence a dense globose head 5-8 mm diam. of whitish or cinnamon coloured compressed spikelets 3-6 mm long, 2-3 mm wide. Glumes at the base of the spikelets falling early. Swamps and damp places; sea level—5,000 ft.

KENYA—Eastern Region and the Coast.

TANGANYIKA—Western Region.

67. *C. angolensis* Boeck.

Sparingly leafy perennial 4 ins.-2 ft. high. Rhizome woody with long internodes and the stems bulbous based. Inflorescence a dense whitish hemispheric head up to 25 mm diam., the spikelets often purple tipped. Bush, open forest where burning is frequent; 2,000-9,000 ft.

TANGANYIKA—Western, Southern Highland and Southern Regions.

UGANDA—Imatong Mts.

68. *C. margaritaceus* Vahl

Slender culmed perennial up to 2 ft. high. Stems with swollen bases on a woody rhizome. Spikelets few, usually 3-7, in a dense head, oblong ovate, up to 20 mm long, 8-10 mm wide. Glumes loosely overlapped usually rather shiny. Similar to *C. obtusiflorus* but most uncommon. Open bush and sandy places; sea level—1,000 ft.

KENYA—Coast.

TANGANYIKA—Western Region and the Coast.

ZANZIBAR—Zanzibar Island.

Various varieties have been recorded in East Africa which, from the descriptions, seem scarcely distinguishable from the more robust form of *C. obtusiflorus*. In the absence of type material of these two species and their numerous forms it has not been possible to distinguish fully between them.

69. *C. obtusiflorus* Vahl

(*C. compactus* Vahl)

Leafy perennial up to 1 ft. high. Stems with swollen bases. Inflorescence a dense hemispheric head 15-20 mm wide with crowded, obtuse compressed spikelets 8-12 mm long, 4-8 mm wide. Glumes obtuse white. Woodland, rocky grassland, damp places, always on sandy soils; sea level—6,500 ft.

KENYA—Widespread.

TANGANYIKA—Widespread.

UGANDA—Widespread.

ZANZIBAR—Zanzibar Island.

70. *C. colymbetes* Kotschy & Peyr.

Leafless perennial up to 2 ft. high with stout sharply triangular stems 2-4 mm wide. Bract solitary as long as the dense 10-30 mm diam. head. Spikelets pale, lanceolate, 8-14 mm long, 6-8 mm wide, compressed. Styles occasionally bifid. In standing water, dams, swamps etc.; 2,000-4,000 ft.

KENYA—Western Region.

TANGANYIKA—Tanga Region.

UGANDA—Western Province.

71. *C. nudicaulis* Poir.

Leafless perennial 1-2 ft. high with slender obtuse-angled stems. Bracts 2, scarcely exceeding the dense head. Spikelets 8-20 mm long, 4-5 mm wide with acute, tawny, green-keeled glumes. Styles 3—2-fid. Swamps and rivers; 3,000-6,500 ft.

KENYA—Western and Central Regions.

TANGANYIKA—Western and Tanga Regions.

UGANDA—Western Province.

72. *C. bellus* Kunth var. *tanganyicanus* Kukenthal

Slender tufted plants up to 5 ins. high becoming rather fibrous at the base. Inflorescence a solitary head of few compressed spikelets 8-12 mm long, 1-2 mm wide. Glumes brown, 2 mm long, with a conspicuous mucro. Rocky upland grassland; 2,500-7,000 ft.

TANGANYIKA—Western, Southern Highland and Southern Regions.

73. *C. kaessneri* C.B.Cl.

Annual 3-9 ins. high. Head dense, hemispheric, 10-25 mm diam. with linear-oblong obtuse spikelets 6-20 mm long, 2 mm wide. Glumes ovate, dark red but paling above. Open grassland, rock crevices, scrub; sea level—4,000 ft.

KENYA—Eastern and Coastal Regions.

TANGANYIKA—Tanga Region and the Coast.

UGANDA—Karamoja.

74. *C. teneriffae* Poir.

Tufted annual up to 9 ins. high somewhat bulbous at the base with membranous sheaths. Head dense, 10-20 mm diam. with 5-10 mm long spikelets broader than in the above species. Glumes purplish or reddish 2.5-5.5 mm long, with a recurved mucro. Damp grassland and seasonal pools; sea level—6,500 ft.

KENYA—Widespread.

TANGANYIKA—Lake, Northern and Tanga Regions.

UGANDA—Western Province and Karamoja.

ZANZIBAR—Zanzibar Island.

75. *C. pygmaeus* Rottb.

(*C. michelianus* (L.) Link subsp. *pygmaeus* (Rottb.) Aschers. & Gracb., *Juncellus pygmaeus* (Rottb.) C.B.Cl.)

Tufted annual up to 6 ins. high. Bracts 3-8, very long and spreading, dilated at the base. Head dense, 6-12 mm diam. with numerous spikelets 3-4 mm long. Glumes almost spirally arranged, lanceolate-ovate, 1-2 mm long. Damp sandy places; 1,000-4,000 ft.

KENYA—Eastern Region.

TANGANYIKA—Lake, Western and Southern Highland Regions.

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